

Work Order ID 138547

138547

Page 1

Monday, November 02, 2015 11:29:34 AM

Item ID: D212-664-101

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: Fwd Crosstube - High

Start Date: 11/2/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/2/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MCJ Date: NOV 02 2015 Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-141	E

MCJ 15-12-07

100	Document Control	0.00	DAS						
100	DOCUMENT CONTROL		6						
DC	Memo	0.00	9-89						
Doc.Control -USB or Paperwork		Photocopy bluefile and create labels as per PPP D212-664-101 CHG006							

IX DAS 26 9-89 DEC 08 2015

110	Pick Kit	0.00							
-----	----------	------	--	--	--	--	--	--	--

110	Packaging	0.00							
Packaging	Memo								

BL 15/11/04

120		0.01							
-----	--	------	--	--	--	--	--	--	--

120	BENDING MACHINE - CROSSTUBES	0.02							
CNC Bend 2	Memo								

BL 15/11/04

CNC Alpha 160 Bender	Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101
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D212-664-101/138547

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N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 11/2/2015 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 11/2/2015 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop ***NR2***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130 QC15- Crosstube Dimensional Check

0.00

130

0.00

OC

Memo

Quality Control

DAS
38
9-8

15-11-04

140

0.00

140

Crosstubes

0.02

Crosstubes

Crosstubes

Memo

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549,using drill table DT8577,set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4.*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Debur
& Inspect for surface damage. Repair damage within limits as per Dwg D212-
664-141

B

15/11/06

Th

15-11-10

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Monday, November 02, 2015 11:29:34 AM

Item ID: D212-664-101 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Fwd Crosstube - High
Start Date: 11/2/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 11/2/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150		0.00							
150									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	***IMMEDIATELY AFTER GRINDING***								
	1- PRESSURE WASH X-TUBE INSIDE AND OUT								
	2- ALODINE AND ACID ETCH X-TUBE INSIDE AND OUT AS PER QSI005.								
160	QC7-Inspect Chemical Conversion Coat	0.00							
160									
QC	Memo	0.02							
Quality Control									
165	QC5- Inspect part completeness to step on W/O	0.00							
165									
QC	Memo	0.00							
Quality Control									

DAS
38
9-89
NOV 11 2015

DAS
49
9-89
15/11/11

Work Order ID 138547

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Monday, November 02, 2015 11:29:34 AM

Item ID: D212-664-101 Accept *N900040100* Setup Start *NS1*
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 Start Date: 11/2/2015 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 11/2/2015 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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170	Outsource process - NDT per QSI038 4.1	0.00							
170									
Outsource2	Memo	2.00							

Outsource process - NDT

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Liquid Penetrant Inspection as per QSI 038
 Issue P/O: 30414
 LPI as per ASTM 1417 Level 2
 Attach copy of NDT results to work order

CY NOV 12 2015 1

180	Receive & Inspect for Damage & Mat'l Certs	0.00							
180	Packaging								
Packaging	Memo	0.00							

Packaging Ensure copy of NDT results attached to work order.

IX 8015-11-12

190	QC5- Inspect part completeness to step on W/O	0.00							
190									
QC	Memo	0.00							

Quality Control

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

Inspect for damage & ensure results are as per Dwg D212-664-141

1 DAS 38 NOV 12 2015

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N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Fwd Crosstube - High

Start Date: 11/2/2015 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 11/2/2015 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200	Spray Painting per QSI005 4.2	0.00							DAS
200	SprayPaint					1			41
	Memo	0.00							9-89
Spray Painting	*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***								15-11-18

1-Prime inside & outside crosstube as per QSI 005 4.2

BATCH: 133084

2- After painting remove masking and apply matte clear coat per QSI005 4.2

BATCH: 132664

3- MASK UNDERSIDE OF CROSSTUBE AS SHOWN ON DWG BEFORE PAINTING

4 -Paint Outside of Tube as per Dart QSI 005 4.2

BATCH: 133325

210

QC14- Inspect Spray Paint

0.00

210

QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

① 15-12-04 PD

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Item ID: D212-664-101

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Fwd Crosstube - High

Start Date: 11/2/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/2/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220		0.00							DAS
220	Crosstubes					1			41
Crosstubes									989
Crosstubes									15-12-1

Memo

0.02

1- Abrade mating surfaces of support and crosstube with 180 grit sandpaper, clean the area with MEK or equivalent as per dwg

2- Install supports with Proseal 890 per D212-664-141 and QSI 015

A/R Proseal 890 Batch: 133071EXP: 2/16

PROSEAL CURE TIME 72 HOURS:

Start: 15-12-1Finish: 15-12-4

3- Install clamps with rubber cushion (ENSURE CLAMPS ARE INSTALL ON TOP SIDE OF CROSSTUBE) using DT9565 as per Dwg D212-664-141.

Torque all clamps to 80-100 IN-LBS.

230

QC5- Inspect part completeness to step on W/O 0.00

230

QC

Quality Control

Memo

0.00

RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 72HOURS AS PER DWG.

① 15-12-04 PD

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Item ID: D212-664-101 Accept *N900040100* Setup Start *NS1*
Revision ID: Stop *NS2*
Item Name: Fwd Crosstube - High
Start Date: 11/2/2015 Start Qty: 1.00 *1* Cust Item ID:
Required Date: 11/2/2015 Req'd Qty: 1.00 *1* Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Pick Kit	0.00							
240									
Packaging	Memo	0.00							DAS 27 9-89
Packaging						510Z	0 330		
250	QC4- 100% Inspect kits for completeness	0.00							
250									
QC	Memo	0.00				IX	DAS 28 9-89	DEC 08 2015	
Quality Control									
260	Packaging	0.00							
260									
Packaging	Memo	0.00				IX	DAS 28 9-89	DEC 08 2015	
Packaging	Identify and pack for shipping as per PPP D212-664-101 Location : FG098								DAS 27 9-89
	FG094								

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Item ID: D212-664-101

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Fwd Crosstube - High

Start Date: 11/2/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/2/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

270

QC21- Final Inspection - Work Order Release

0.00

270

QC

Memo

0.00

Quality Control

MLJ

DEC 09 2015

MLJ

DEC 09 2015

Picklist Print

Monday, November 02, 2015 11:29:39 AM

Page 1

Work Order ID: 138547

138547

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Fwd Crosstube - High

Start Date: 11/2/2015

Required Date: 11/2/2015

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:E04.02.16ReformatKJ/DS
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
 IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H
 11.04.26 inspection strip ecn 11-549 EC verf by:DD IPP REV:I 14.05.27
 AS PER ECN 14-570 DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D212-664-101TRN

Manufactured No

110

Each

5.0000

1

1

D212-664-101TRN

Crosstube Turning Detail

1 BL 15/11/04

Location	Loc Qty	Loc Code
LG014	5	
135811	1	
135813	1	
135814	1	
137031	1	
137033	1	

D3595-063-450

Manufactured No

230

Each

52.0000

4

4

D3595-063-450

Rubber Cushion 0.63" wide x 4.50" Long

DAS
41

9-89 15-11-30

138342

4

Location	Loc Qty	Loc Code
FG	22	
129907	10	
131013	6	
88422	6	
LG052	30	
136574	30	

Picklist Print

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Work Order ID: 138547

138547

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Fwd Crosstube - High

Start Date: 11/2/2015

Required Date: 11/2/2015

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased

No

220

Each

76.0000

4

4

MS21920-25

Clamp

DAS
41
9-89

15-11-30

Location

Loc Qty

Loc Code

FG

10

120920

10

LG050

57

M130400

10

M132169

11

M133336

36

LG057

9

M133091

9

D2893-1

Manufactured

No

220

Each

1.0000

2

2

D2893-1

Support

DAS
41
9-89

15-11-30

Location

Loc Qty

Loc Code

FG

1

126658

1

D3428-1

Manufactured

No

240

Each

57.0000

1

1

D3428-1

Placard

DEC 07 2015

DAS
27
9-89

Location

Loc Qty

Loc Code

ST035

9

131158

9

ST038A

48

133206

12

135955

24

136739

12

10/7/2016

DAS
28
9-89

DAS
28
9-89

Monday, November 02, 2015 11:29:39 AM

Required Qty: 1.00

200
27
9-89

DAS
6

9-89

DAS
27
9-89

17

DEC 07 2015

Picklist Print

Monday, November 02, 2015 11:29:39 AM

Work Order ID: 138547

138547

Parent Item: D212-664-101

D212-664-101

Parent Item Name: Fwd Crosstube - High

Start Date: 11/2/2015

Required Date: 11/2/2015

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0663J

Purchased

No

240

Each

1,068.000

18

18

NAS1149D0663.J

Washer

DAS
27
9-39

DAS
28
9-89

Location

Loc Qty

Loc Code

ST260

227

M131618

227

ST260a

774

M132256

474

M133134

300

ST269

67

M126334

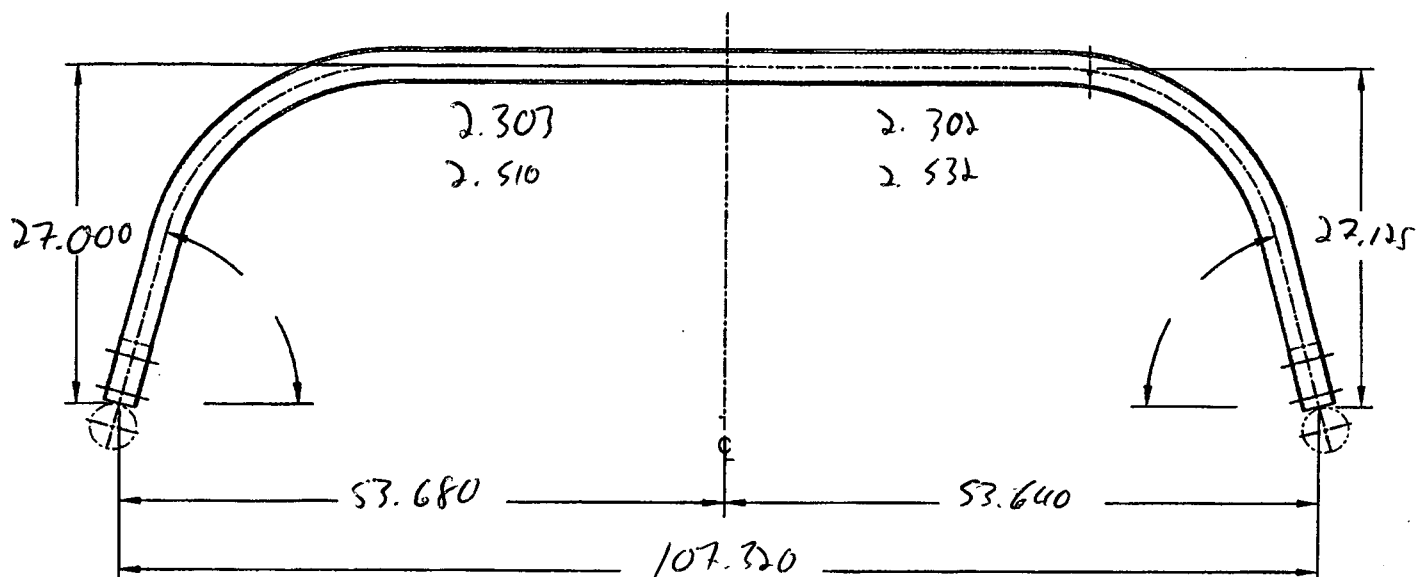
67

18

DEC 07 2015

DART AEROSPACE LTD		Work Order: 138547
Description: Crosstube High Fwd (205/212/412)		Part Number: D212-664-101
Inspection Dwg: D212-664-141 Rev: E		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7
Bending Passes	3	--
Crushing	--	7.2%



	Side A	Side B
Bending Passes	5	5
Crushing	4.7%	4.9%
Comments		

QC15 Inspection	DAS
Date	38
	9-80
	15-11-04

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	08.04.21	Dwg Rev updated	KJ/JM	
C	10.04.01	Dwg Rev updated	KJ	
D	12.04.16	Added bending, crushing dimensions	KJ	
E	14.07.28	Revised max crushing %	KJ	

Item	Qty -141	Qty -141B	Qty -141F	Part Number	Description
1	X			D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X		D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3			X	D212-664-141F	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD) (ANODIZED)
4	1	1	1	D6005-128	CROSSTUBE
5	2		2	D2893-1	SUPPORT
6	4	4	4	D3595-063-450	RUBBER CUSHION
7		2		D5017-1	SUPPORT
8	4	4	4	MS21920-25	CLAMP (OR MS21920-28)
9	A/R	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 128.514±0.020
- FINISH -141 & -141B: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT

- FINISH -141F: a) ANODIZE PER MIL-A-8625, TYPE II, CLASS 1.
b) ALODINE (DO NOT ETCH) PER QSI 005 4.1.2
c) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
d) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
e) PAINT OUTSIDE PER DART QSI 005 4.2
f) REMOVE MASKING AND APPLY MATTE CLEAR COAT

***NOTE:** BETWEEN FINISHING OPERATIONS EXTREME CARE MUST BE TAKEN NOT TO CONTAMINATE OR DAMAGE FINISHED SURFACES.

- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER 'D212-664-XXX' AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS
- WEIGHT: D212-664-141/-141B/-141F = 33.8 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

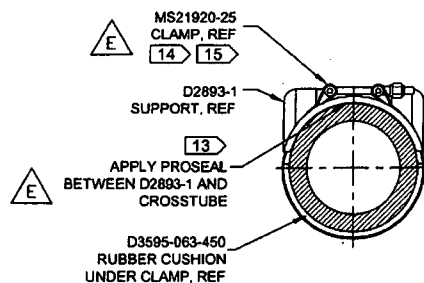
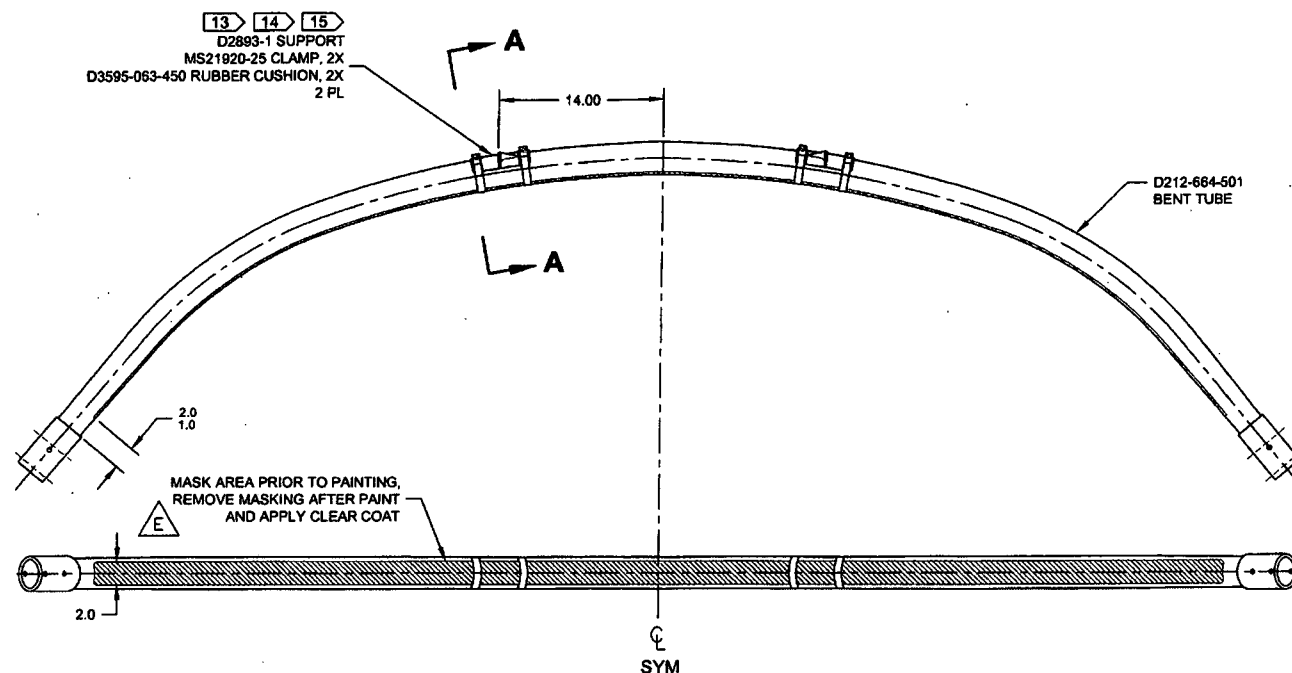
ASSEMBLY

- TO INSTALL D2893-1 / D5017-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO A REVISION
WITHHELD NOTICE
WORK ORDER
NO 138547 ML5
15-10-02

RELEASED
2014-05-26
WLD

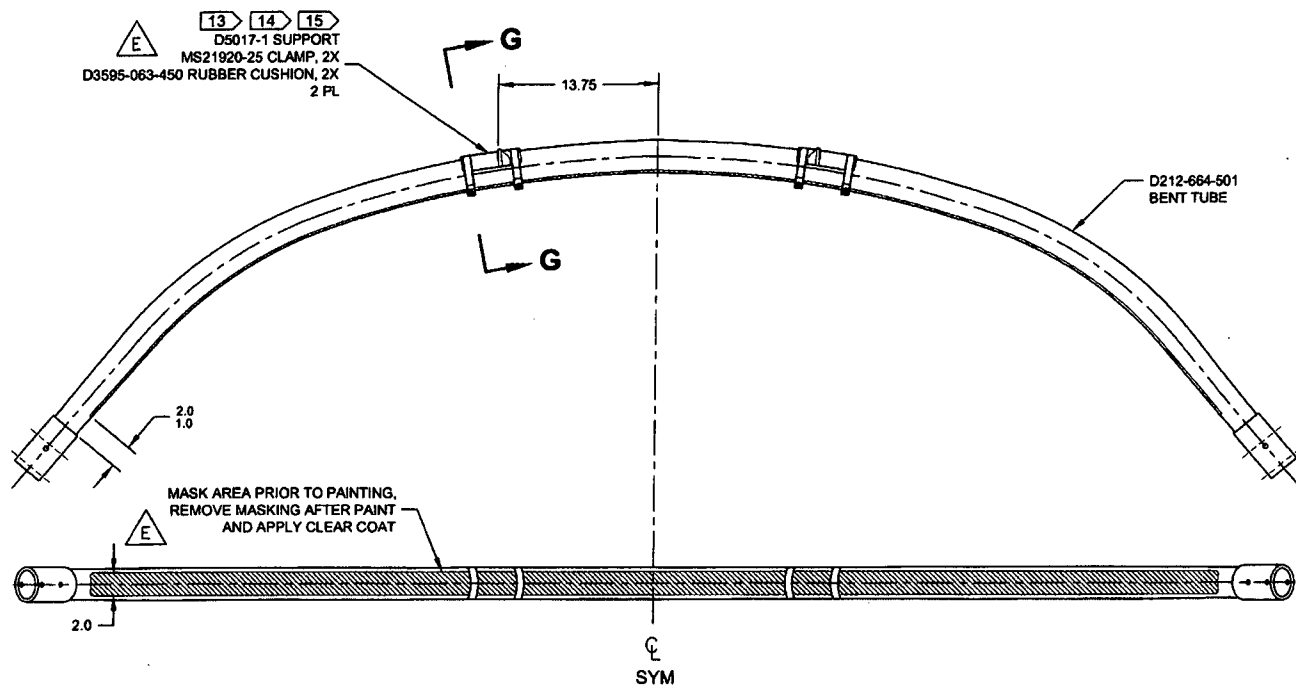
E	ADD -141F, D5017-1 WAS D2893-1 (-141B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-3), INCORP. DEO D-1/2/3	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 & B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	P		
DRAWN	P		
CHECKED	DW		
MFG. APPR.	JA		
APPROVED	TH		
DE APPR.	TH		
DATE	14.04.01		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D212-664-141 TITLE XTUBE ASS'Y (205/212/412 HI FWD) SCALE NTS REV. E SHEET 1 OF 5 COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMED OR REPRODUCED IN ANY MANNER WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			



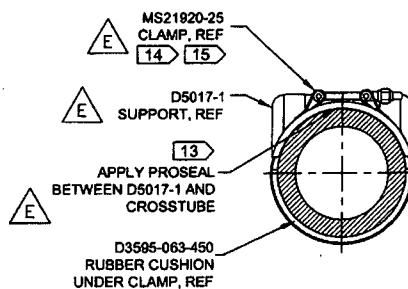
D212-664-141/-141F
ASSEMBLY DETAIL

RELEASED
2014-05-26
ND

DESIGN	DP	DART AEROSPACE LTD	
DRAWN	DP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DP	DRAWING NO.	REV.
MFG. APPR.	DP	D212-664-141	SHEET 2 OF 5
APPROVED	DP	TITLE	SCALE
DE APPR.	DP	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
DATE	14.04.01	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



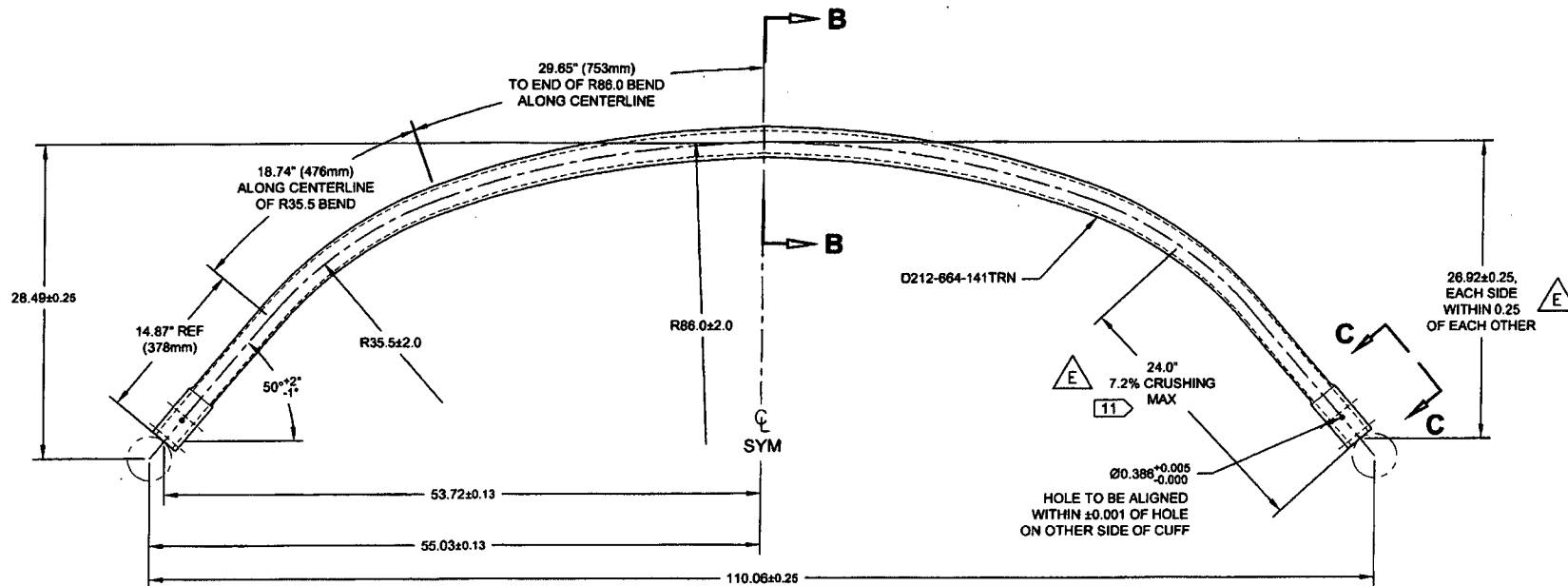
D212-664-141B
ASSEMBLY DETAIL



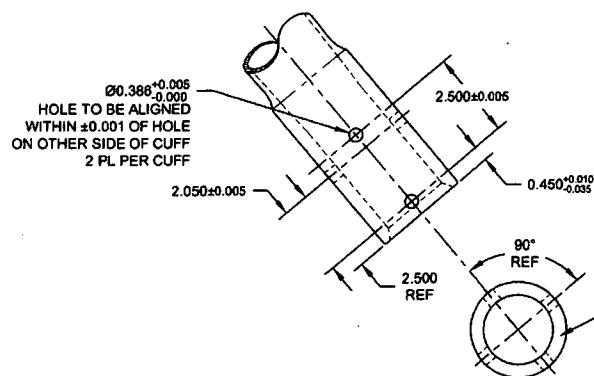
SECTION G-G
SCALE 4X

RELEASED
2014-05-26

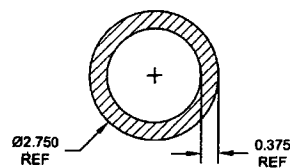
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. E
MFG. APPR.		D212-664-141	SHEET 3 OF 6
APPROVED		TITLE	SCALE
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D212-664-501
BENDING AND DRILLING DETAIL



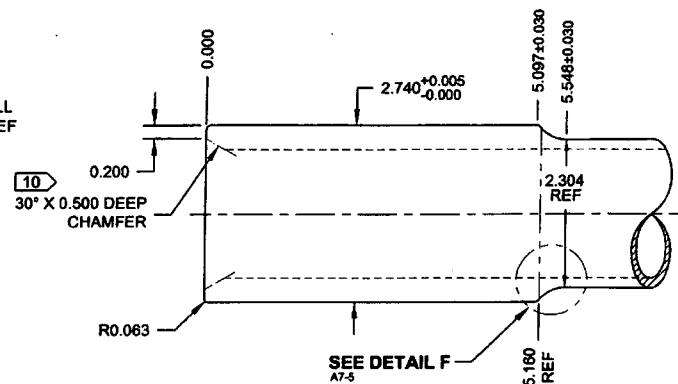
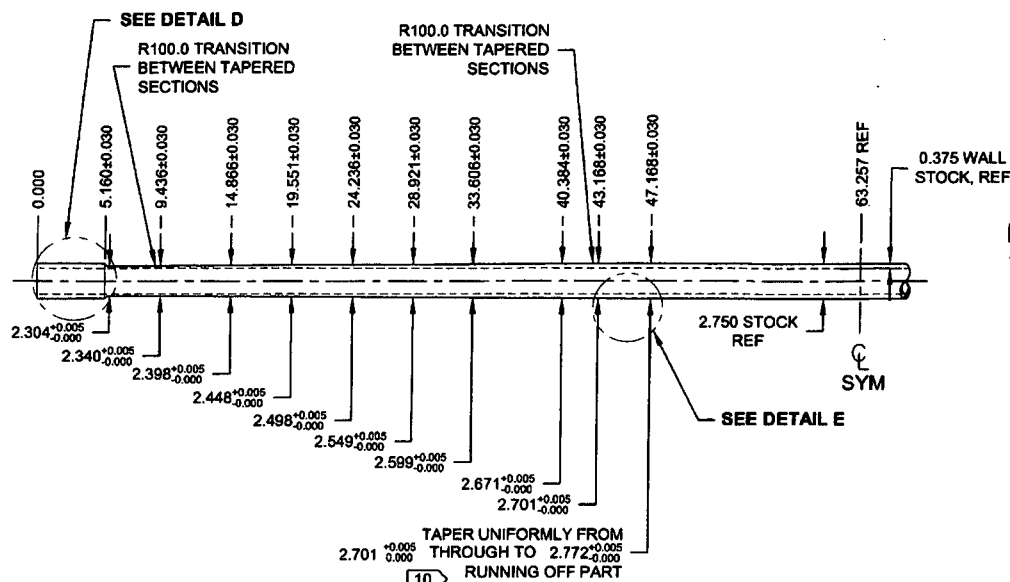
VIEW C-C: CUFF DETAIL
SCALE 3X



SECTION B-B
SCALE 4X

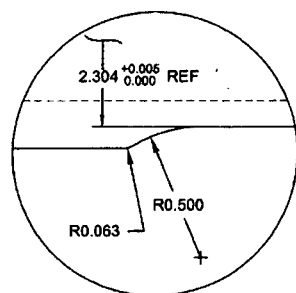
RELEASED
2014-05-26

DESIGN	<i>Q</i>	DART AEROSPACE LTD	
DRAWN	<i>Q</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>Q</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>MS</i>	D212-664-141	SHEET 4 OF 5
APPROVED	<i>MS</i>	TITLE	SCALE
DE APPR.	<i>H</i>	XTUBE ASS'Y (205/212/412 HI FWD)	NTS
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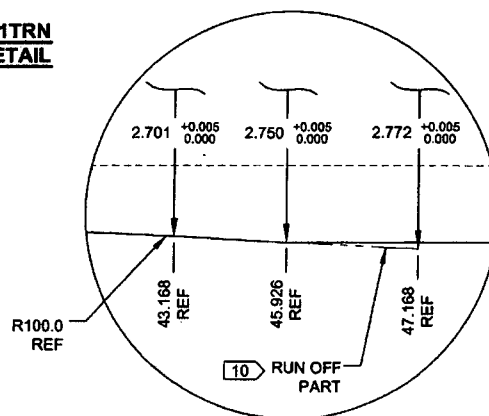


DETAIL D:
CROSSTUBE CUFF
SCALE 5X

D212-664-141TRN
TURNING DETAIL



DETAIL F:
CUFF TRANSITION
SCALE 10X



DETAIL E:
TAPER RUN-OFF
NOT TO SCALE

RELEASED
2014-05-26

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D212-664-141	SHEET 5 OF 5
APPROVED		TITLE	SCALE
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DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Skid-tube ☐</td> <td style="width: 15%;">Cross tube ☐</td> <td style="width: 15%;">Water Jet ☐</td> <td style="width: 15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																							
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Date : _____		Step #: _____		QTY Effective : _____			MRB (QSI042) Approval																																																								
Description Work Order Deviation				Disposition				Completed By																																																							
								Lead hand / Supervisor Approval Verification																																																							
								QC / QA Coordinator Approval																																																							
Root Cause				FAULT CATEGORY																																																											
Environment ☐	Design ☐	Doc/Data ☐	Equip/Tooling ☐	Handling/Pre ☐	Material ☐	Internal Transport ☐	Tribal Knowledge ☐	LOA ☐	Substation ☐	Past Expiry Date ☐	Misidentified ☐	No Re-verification ☐	Operator ☐	Offset/Setup ☐	Supplier ☐	Training ☐	Use for Testing ☐	Poor Information ☐	Rushing ☐	Product Improvement ☐	Process Improvement ☐	Manufacturing Process ☐	Past Due ☐	Pressure/Forced ☐	Bending ☐	Centre Not Concentric ☐	Cracks ☐	Crimp/Kink/Ripple/Wave ☐	Cuffs ☐	Crushing ☐	Heat Treat ☐	Wave/Twist in Tube ☐	Marks/Chatter ☐	Temperature/Cure ☐	Set-up ☐	BOM/Route ☐	Broken/Damage/Defect ☐	Inspection Incomplete/Unqualified ☐	Contamination ☐	Countersink ☐	Cut Too Short ☐	Instructions Incomplete/Unclear ☐	Drill Holes ☐	Power Loss/Surge ☐	Folio/Program ☐	Grain ☐	Weld ☐	Wrong Stock Pulled ☐	Out of Sequence ☐	Off-set ☐	Mislabeled ☐	Fit/Function ☐	Misaligned/off center ☐	Positioned Wrong ☐	Outside Dimensions ☐	Over/Under tolerance ☐	Part Incorrect ☐	Part Lost/Missing ☐	Part Moved ☐	Drawing ☐	Finish ☐	Misread ☐	Turning Sequence ☐
OTHER : _____																																																															

D212-664-101

BATCH NUMBER:

SET UP - 2.75 Rollers x 3 w/1.6" shims
2.875" in buggy A

TANGENT LINES from cuff @ 33.6, **36.46 RED**, then Centerline is @ 63.25

MIDDLE BENDS

Start bending @ 33.6 line with longest part of tube on small table. Appr is **2600** on both Y&W.

Use program 212fMauto .

MATCH MIDDLE BEND TO OUTLINE ON REFERENCE BOARD slightly below line is acceptable. (no more than 0.030")

DO NOT underbend middle or you will have issues finishing tube

use middle fix program if not bent enough ..(mfix, mfix2)

If middle still is underbent modify 24" section of middle fix program and re-run.

SIDE BENDS

Start bending @ 36.46 line. with longest part of tube on large table **1500** appr on Y and **3735** on W. W stays @ this appr on all programs. Run 1-2-3 without stopping, then check, .

If tube isn't bent enough run 3aaa and up as required to finish. .checking between each program.. ... **2000** for Y and **3735** for W..

Notes:

- underbent middle by approx 0.060". was UNABLE to reach nominal dimensions. scrapped tube after rebending middle to achieve nominal dimensions. "middle fix after sides are bent" was over effective, it runs from centre line out. therefore. DO NOT underbend middles, and use caution if using "middle fix after sides are bent" program. jw 12/6/1

14/02/26.. Bent 4 tubes, (Ran 212fMauto, Mfix, Mfix2) middle finished even to outline on new board.

Side bends were prog.(1,2,3,3c..CHECK) ran 5,6 and up checking between each until finished (prog. 4 was skipped on all 4 tubes)

Passes:

+	MA	T
2	MA	2
3	MA	3
3c	MA 1	3c
5		5
6		6
7		7
8		8

DART
AEROSPACEDart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053**PURCHASE ORDER**Purchase Order ID **PO30414**

Purchase Order Date 11/11/2015

PO Print Date 11/12/2015

Page Number 3 of 8

Order From :

VC-SKY001

Ship To : DART AEROSPACE LTDSKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA**Contact Name****Vendor Phone**

905-678-5636

Buyer

Chantal Lavoie

Customer POID**Customer Tax #**

10127-2607

Terms

Net 30

Currency

CAD

FOB

FCA - (Free Carrier)

Ship To Contact**Ship To Phone****Ship Via:**

Delivered

Ship Acct:**Line Total: \$96.50**

6	138614	D212-664-101 CROSSTUBE	11/12/2015	1.00	\$96.50	\$96.50
---	--------	---------------------------	------------	------	---------	---------

Yes

11/12/2015

SAME AS ABOVE

Line Total: \$96.50

7	138615	D212-664-101 CROSSTUBE	11/12/2015	1.00	\$96.50	\$96.50
---	--------	---------------------------	------------	------	---------	---------

Yes

11/12/2015

SAME AS ABOVE

Line Total: \$96.50

8	138547	D212-664-101 CROSSTUBE	11/12/2015	1.00	\$96.50	\$96.50
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Yes

11/12/2015

SAME AS ABOVE

Note:

8015-11-12

11/12/2015

**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO26386	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30414
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 18 CROSSTUBES AND 4 RAPPEL SLIDE BARS AS PER PO30414

4 RAPPEL SLIDE BARS, ITEM ID# D3011-1, WORK ORDER ID# 136063

8 FWD CROSSTUBES, ITEM ID# D212-664-101, WORK ORDER ID# 138548, 136075, 138547, 138549, 138551, 138614, 138550, 138615

7 AFT CROSSTUBES, ITEM ID# D212-664-201, WORK ORDER ID# 136085, 136081, 136083, 130376, 136082, 136084, 130375

3 FWD CROSSTUBES, ITEM ID# D206-667-101, WORK ORDER ID# 135128, 135129, 135130

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M13 NO CRACK FOUND PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						NOV 11 2015	
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	
		DA:					
		38					
		9-89					
		NOV 12 2015					

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp 	Date: NOV 11 2015
Name: RAFIK MEZIANE		